III. Adaptablity

[0067] To limit the number of physical controls on the device (thereby maximizing the display area), the multi-functional hand-held device is preferable adaptable, i.e., the device is capable of changing its UI based on how the device is to be used. For example, if a cell phone functionality of the multi-functional device is to be used, the UI changes to accommodate the cell phone. Alternatively, if the PDA aspect of the multi-functional device is to be used, the UI changes to accommodate the PDA, etc. In essence, the multi-functional device is capable of reconfiguring its user interface based on the state or mode of the device.

[0068] Adaptability may be accomplished by reassigning the functions of the limited number of physical buttons for each device functionality. For example, a button may perform one function when a first device is activated and another when another device is activated. While this may work, it suffers from physical limitations (i.e., the number of buttons) and can be confusing to the user (who must keep track of different button meanings).

[0069] Alternatively adaptability may be accomplished by virtually incorporating the physical inputs for each functionality into the GUI in conjunction with a touch screen. This allows the GUI to adapt to whatever device is selected, and the touch screen can receive inputs corresponding to the GUI. With a GUI for each functionality, the UI for the hand-held device adapts such that the multi-function device, in effect, becomes a particular device. For example, if the cell phone functionality is selected, the GUI presents a set of virtual or soft controls that look similar to the physical controls typically used on a cell phone, such as a keypad, function buttons and possibly a navigation pad, for example.

[0070] The entire display may be used to present this information, or only a portion of the display may be used for the GUI controls. In the later case, referring to **FIGS. 5-8**, the GUI **150** may be separated into a standard region **152** and a control region **154**. The standard region **152** represents what would normally be displayed on the display **122** when using a particular device. That is, the standard GUI screens associated with the selected device are displayed in the standard region. For example, in the case of the PDA, a main menu (window with a set of icons), calendar, address book or date book may be displayed in the standard region **152**. The control region **154**, on the other hand, virtually represents the physical controls that would normally be physically placed on a particular device. That is, the virtual controls that mimic the physical controls are displayed in the control region **154**. For example, in the case of the PDA, the control region **154** may include virtual representations of a hand writing recognition area, a navigation pad and the standard function buttons.

[0071] The standard and control regions **152** and **154** can be positioned at any position on the display **122** (top, bottom, sides, center, etc.). For example, as shown in **FIG. 5**, they may be positioned vertically relative to one another (one on top of the other) or as shown in **FIG. 6**, they may be positioned horizontally relative to one another (side by side). These configurations can be used in either portrait or landscape modes. By way of example, in cases where the device is operated in landscape mode, the standard region **152** may be placed on one side and the control region may be placed on the opposite side. Landscape orientation may, for example, facilitate one handed operation. In some cases, the side on which the controls are displayed is based on the handedness of the user. For example, the controls may be place on the right side for right-handed users, and the controls may be placed on the left side for left-handed users. Alternatively, the controls may be placed on both sides as shown in **FIG. 7**. This arrangement is particularly well suited for game playing. Furthermore, the amount of area dedicated to each portion may be widely varied. For example, the screen may be divided equally and in other cases one or the other portion constitutes a greater amount of the display. In some cases, the standard region **154** is maximized to increase the normal viewing area of the display.

[0072] When a particular functionality is selected for use, the hand-held device loads the software for the selected functionality and configures the GUI **150** including the standard region **152** and the control region **154**. The controls in the control region **154** can therefore be used to control whatever is being shown in the standard region **152**. In some cases, the control region **154** may even change in accordance with the needs of each displayed window for the particular device.

[0073] Alternatively, as shown in **FIG. 8**, virtual controls **160** may be overlaid on top of the standard region **152** so that the standard region **152** can fully utilize the entire display **122**. In fact, the virtual controls **160** may appear and disappear as needed. For example, the user may touch the screen and this may drive the device to display the controls over a portion of the display including whatever is already displayed. Examples of virtual controls that operate in this manner can be found in U.S. patent application Ser. No. 11/038,590, titled "Mode-Based Graphical User Interfaces for Touch Sensitive Input Devices," filed on Jan. 18, 2005.

A. GUI Based on Functionality

[0074] **FIGS. 9-17** illustrate various examples of GUIs for different states or modes of the multi-functional device.

[0075] **FIG. 9** is a diagram of a GUI **170** that is used in a PDA mode. As shown, the GUI is divided into a standard region **152** and a control region **154**. Located inside the control region **154** are a virtual handwriting pad **172**, four virtual buttons **174** and a virtual navigation pad **176**.

[0076] **FIG. 10** is a diagram of a GUI **180** that is used in a cell phone mode. As shown, the GUI **180** is divided into a standard region **152** and a control region **154**. Located inside the control region **154** are a virtual keypad **182**, a virtual navigation pad **184** and two virtual buttons **186**.

[0077] **FIG. 11** is a diagram of a GUI **190** that is used in a music player mode. As shown, the GUI **190** is divided into a standard region **152** and a control region **154**. Located inside the control region **154** are a virtual scroll wheel **192** and five virtual buttons **194**. Additional details on a virtual scroll wheel are provided in U.S. patent application Ser. No. 11/038,590, titled "Mode-Based Graphical User Interfaces for Touch Sensitive Input Devices," filed on Jan. 18, 2005.

[0078] **FIG. 12** is a diagram of a GUI **200** that is used in a video player mode. As shown, the GUI **200** is divided into a standard region **152** and a control region **154**. Located inside the control region **154** are a plurality of virtual buttons **202**. Alternatively, the controls may appears and disappears